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ABSTRACT

The Cooperative Elementary School (CES) model involves the use of cooperative learning across a variety of content areas and full-scale mainstreaming of academically handicapped students. Teachers use peer coaching and plan in a cooperative manner. The model emphasizes teacher involvement in site-based management and parent involvement in the schools. A 2-year study of the CES model was conducted at five elementary schools in a suburban Maryland school district, including two experimental schools that had been restructured according to the CES model and three control schools that used traditional methods and curriculum. Subjects were 1,112 students in second through sixth grade. California Achievement Test scores for reading, language, and mathematics for classes in the five schools were analyzed. Results indicated that students in the experimental schools had significantly higher achievement than students in the control schools in reading vocabulary, reading comprehension, language expression, and math computation. Academically handicapped students in the CES had significantly higher achievement in reading vocabulary and comprehension, language expression, math computation, and math application. Handicapped students in the CES experienced greater social acceptance by nonhandicapped peers than did handicapped students in traditional schools with pull-out remedial programs. There were also better overall social relations in the CES. (AC)

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# The Cooperative Elementary School: Effects on Students' Achievement, Attitudes and Social Relations

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Abstract

This paper reports the results of a 2-year study of the Cooperative Elementary School model of a restructured elementary school. The components of the model include: using cooperative learning across a variety of content areas, full-scale mainstreaming of academically handicapped students, teachers using peer coaching, teachers planning cooperatively, teacher involvement in site-based management, and parent involvement in the school. The results indicate that students in the Cooperative Elementary School had significantly higher achievement in reading vocabulary, reading comprehension, language expression, and math computation. Academically handicapped students in the Cooperative Elementary School had significantly higher achievement in reading vocabulary, reading comprehension, language expression, math computation, and math application. There also were better social relations in the Cooperative Elementary School, and handicapped students were more accepted socially by their nonhandicapped peers than were similar students in traditional schools with pull-out remedial programs.

**The Cooperative Elementary School: Effects on Students' Achievement, Attitudes and Social Relations**

Cooperative learning methods have been researched for more than 20 years, and have been rapidly increasing in use over the past decade. However, until recently almost all applications of cooperative learning methods have been implemented teacher by teacher, usually in one subject at a time, and few studies have involved durations of more than a semester (see Slavin, 1990). Cooperative learning methods can certainly be justified as additions to teachers' instructional repertoires in traditionally organized schools, but the potential for cooperative approaches to serve as the organizing principle for major school restructuring has not been assessed. Could cooperative learning be used on a broad scale in many subjects and over extended time periods to fundamentally change the organization of schools and classrooms? Would cooperative learning methods still be effective if they became the primary mode of instruction in schools, and would they maintain their effectiveness over time? Would school-wide use of cooperative principles enhance the school's potential to successfully implement other restructuring elements, such as full-scale mainstreaming? These were the principal questions addressed in the study reported here.

Research on Cooperative Learning

Slavin (1990) recently reviewed research on effects of cooperative learning, focusing on studies of at least 4 weeks' duration which compared cooperative learning and control classes on objectives pursued equally by both. For achievement, the review concluded that two conditions were essential to the success of cooperative learning. One is that some sort of group rewards or group goals must be given to learning groups to

motivate students to help their groupmates learn. The other is that the group's success must depend on the individual learning of all group members. For example, most successful cooperative learning methods provide certificates, recognition, or (occasionally) grades to students based on the average of all group members' individual quiz scores, compositions, or other individual products. The key concept is that students perceive their role to be to help their groupmates learn, not to simply help them complete a single group task. The research of Webb (1985) and others has shown that achievement gains in cooperative learning depend on the giving and receiving of elaborated explanations of concepts and skills, and that giving and receiving answers are negatively related to achievement gain. Explanations force student to evaluate, integrate, and elaborate on knowledge and thus improve their understanding or depth of processing of what is being learned (Brown & Campione, 1986; Wittrock, 1986). It is hypothesized that the use of group goals and individual accountability motivates students to provide high-quality explanations to each other and to avoid simply giving answers. Reviewers of the extensive literature on cooperative learning and student achievement have generally agreed that group goals and individual accountability are essential for achievement effects (Davidson, 1985; Johnson & Johnson, 1989; Newmann & Thompson, 1987; Slavin, 1990). Cooperative learning programs which incorporate these elements consistently increase student achievement more than control methods. Updating Slavin's (1990) estimates, a total of 46 such studies were found to have a median effect size on achievement measures of +.32.

Effects of cooperative learning have also been found on many variables other than achievement, including intergroup relations (Johnson & Johnson, 1989; Slavin, 1985,

1990), self-esteem, attitudes toward class and school, and ability to work collaboratively with others (Johnson & Johnson, 1989; Slavin, 1990). These noncognitive outcomes do not seem to depend on the use of group goals and individual accountability.

One set of outcomes of particular importance to the present study relates to cooperative learning as a means of mainstreaming academically handicapped students. Several studies have found that mainstreamed academically handicapped (e.g., learning disabled) students are better accepted by their classmates in cooperative learning classes than in traditional classes (Madden & Slavin, 1983; Johnson & Johnson, 1989; Slavin, 1990). Two of the cooperative learning methods, Team Accelerated Instruction-Mathematics (Slavin, Leavey, & Madden, 1986) and Cooperative Integrated Reading and Composition (Stevens, Madden, Slavin, & Farnish, 1987; Stevens & Slavin, 1991) were designed to accommodate a wide range of performance levels within the same classroom by using a combination of cooperative, individualized, and subgrouped tasks. One purpose in the development of these models was to create classrooms in which academically handicapped as well as nonhandicapped students could work together and still have their unique academic needs met. Studies of these methods have found positive effects of these programs on the achievement of academically handicapped as well as nonhandicapped students (Slavin, 1984; Slavin, Stevens, & Madden, 1988).

As noted earlier, most studies of cooperative learning have taken place over periods of less than a semester. Year-long studies of programs using group goals and individual accountability have generally been as successful as shorter studies in enhancing student achievement (e.g., Slavin & Karweit, 1984; Slavin, Madden, & Leavey, 1984; Stevens, Madden, Slavin, & Farnish, 1987). The few multiyear studies that have

been done have found mixed effects. Talmage, Pascarella, and Ford (1984) studied a 3-year staff development emphasizing methods developed by Sharan and Sharan (1976) in which students were instructed to break group tasks into subtasks and were graded based on an evaluation of the group's product. This program produced small positive effects on student achievement in reading and language arts. Another study recently reported by Solomon, Watson, Schaps, Battistich, and Solomon (1990) implemented cooperative learning methods over a 5-year period, starting with children in kindergarten and continuing with the same cohort through the fourth grade. The program avoided use of any group rewards or individual accountability. No effects on achievement were found in comparison to control schools, but there were positive effects on such variables as prosocial behavior, social problem solving, and adherence to democratic values.

The Cooperative Elementary School: Objectives

The cooperative elementary school program was designed in an effort to achieve several objectives as listed below.

**1. To capitalize on the school's capacity for collaborative change.** One of the key ideas behind the cooperative elementary school design is that it is important to build collaborative relationships among the school staff if cooperative learning is to thrive in the classroom.

**2. To improve the quality of classroom implementations of cooperative learning by changing school organization, staff development, and other practices.** All too often, teachers learn to use cooperative learning methods by going to workshops or courses and then returning to their classes to try to figure out how to make the ideas work in their own context with little support. One objective of the cooperative

elementary school model was to provide teachers implementing cooperative learning with appropriate training, long-term assistance from building administration, fellow teachers, and others, and other supports to help them fundamentally change their teaching practices.

**3. To use cooperative learning and teacher collaboration as a vehicle for effective mainstreaming.** A major goal of the cooperative elementary school is to create a school climate accepting of student differences and specific mechanisms to enable regular and special education teachers to work collaboratively to meet the diverse needs of students, including those with academic handicaps.

**4. To test the limits of cooperative learning as a primary mode of instruction.** As noted earlier, cooperative learning has usually been implemented and studied in one subject at a time. Critics (e.g., Bossert, 1989) have sometimes wondered whether effects of cooperative learning may be due to novelty or Hawthorne effects, and whether intensive, long-term use of cooperative programs might be ineffective. On the other hand, it may be that as students experience cooperative methods in many subjects and for long periods, their increasing skill in working cooperatively and a perception that cooperation leads to success in the school could make widespread and long-term use of cooperative learning more effective than shorter implementations.

**5. To institutionalize cooperative learning in the school's program.** One problem often experienced in long-term maintenance of successful individuals is that as key individuals associated with the innovation leave and others arrive, the program gradually disappears. One objective in designing the cooperative elementary school program was to try to make cooperative learning the organizing principle of school

restructuring, so that as new teachers or administrators came to the school they would be introduced to the school's philosophy and trained in cooperative methods, so that the program could continue and grow past the tenure of any particular individuals.

Cooperative Elementary School: Elements

The major elements of the cooperative elementary school model were designed to achieve the five objectives outlined above and are listed below (see Slavin, 1987).

**1. Widespread use of cooperative learning in academic classes.** A major emphasis of the cooperative elementary school design is the use of cooperative learning methods in many subjects and grade levels. Teachers in the cooperative schools are offered training, materials, follow-up, and assistance to use in any of the John Hopkins cooperative learning models (Slavin, 1986). A particular emphasis is placed on the two comprehensive programs which are redesigned to accommodate student diversity: Cooperative Integrated Reading and Composition, or CIRC (Stevens et al., 1987; Stevens & Slavin, 1991) and Team Assisted Individualization-Mathematics, or TAI (Slavin et al., 1984, 1986). These programs include instructional materials, teacher's manuals, and other supports to enable teachers of grades 2-6 to use them as their primary approaches to the teaching of reading, language arts/writing, and mathematics, respectively. Research on TAI (e.g., Slavin et al., 1984; Slavin & Karweit, 1985) and CIRC (Stevens et al., 1987; Stevens & Slavin, 1991) have found these methods to be among the most effective of all cooperative learning programs for accelerating student achievement. Teachers rarely implement cooperative learning in all subjects. Rather, teachers are offered training and materials which would enable them to implement cooperative learning methods in any subject, and they then select the subjects in which they will implement at any given time.

All teachers were urged (but not required) to use CIRC and TAI, but use of other cooperative learning methods in social studies, science, and other subjects varied considerably from teacher to teacher.

**2. Full-scale mainstreaming of all special education students.** Another key element of the cooperative school model is the intention to mainstream virtually all academically handicapped students. Special education students are assigned to regular homerooms and stay in regular classes all day. During reading and math periods, special education teachers team with regular classroom teachers using CIRC or TAI. In both of these methods, students work in heterogeneous teams, but receive most instruction in homogeneous teaching groups drawn from the various teams. Academically handicapped and other low-achieving students are generally taught by the special education teachers. The handicapped students are integrated with nonhandicapped students on cooperative learning teams and participate in all team activities. During periods other than reading and math, the academically handicapped students remain in the classroom and are taught by the classroom teacher.

**3. Peer coaching.** Peer coaching is one of the most effective means of ensuring high-quality implementation and maintenance of classroom innovation (Joyce, Hersh, & McKibbin, 1983). In the cooperative elementary school, teachers are given opportunities to visit each other's classes and to provide support and feedback to one another. In particular, teachers who successfully implemented a given cooperative learning method serve as peer coaches to those who receive training later one.

**4. Cooperative planning.** Cooperation between teachers is not limited to peer coaching. Teachers are given time to plan common strategies and activities in their

classes. This gives the teachers an opportunity to coordinate the content across classes and facilitates the sharing of instructional materials. Teachers also use their planning time to develop classroom strategies that help to cover content effectively and to resolve management problems that may occur.

**5. Site-based management.** In the cooperative elementary school, the teachers and administrators work together to establish goals for the school and a plan of action to attain those goals. Each school organizes a building-level steering committee made up of teacher representations from each grade, special education, and other remedial services (e.g., chapter 1), and the principal. The committee meets regularly to discuss the school's progress in meeting educational goals and to recommend changes in school policy and instructional practices to achieve these goals. While the principal remains the instructional leader in the school, and is ultimately responsible for making school-wide decisions, the steering committee provides valuable input in the decision-making process.

**6. Cooperation with parents and community.** The Cooperative Elementary School encourages the participation of parents and the community in school activities to develop a sense of joint responsibility for children's success in school. Parents and the community were introduced to the project as it was initiated. They were given an explanation of each of the components of the Cooperative Elementary School as well as their responsibility to encourage and monitor students' educational progress at home. Parents were also presented with the school's expectations concerning homework and independent reading, and the parent's role in making sure that those are accomplished. The Cooperative Elementary Schools also maintained regular contact with parents

through regularly scheduled teacher-parent conferences, PTA meetings, and a school newsletter. The latter kept parents informed of events at the school, changes in school policy or programs, and notable successes of students, classes, or teachers.

## Method

### Subjects and Design

The subjects were 1,112 students in second through sixth grade in four elementary schools in a suburban Maryland school district. The classes in the two experimental schools were matched with classes in the three control schools on California Achievement Test scores for Total Reading, Total Language, and Total Mathematics. There was also an attempt to control for ethnic and socioeconomic background of the students by selecting control schools from the same or similar neighborhoods. The student populations ranged from 4 to 15% minority students ($M$ = 7.3%), and from 2 to 20% ($M$ = 10.2%) disadvantaged students (i.e., those receiving free or reduced-price lunch). The schools' special education population averaged 9.3%, and across the four schools it ranged from 7 to 12%.

### Selection of Schools

Experimental. Since the Cooperative Elementary School required school-wide change and encouraged teacher participation in decision-making, we felt it was important to have teachers involved in determining whether their school would participate in this project. Prior to beginning the project we approached a number of schools in a Maryland school district that agreed to cooperate in the project. At each school we presented a brief overview of what was involved in the project, the duration, and the potential benefits. After answering teachers' questions and concerns, the staff

voted on participating in the proposed project. Only if 75% of the faculty agreed was the school selected for the project.

Control. The control schools were selected from school district records of school's achievement, ethnicity, and socioeconomic background. This data was used to select control schools which were well matched with the two experimental schools on these independent and demographic variables.

Treatments

Control. The control schools continued using traditional methods and curriculum. In reading, this consisted of two or three reading groups in a basal series, with workbooks, worksheets, and teacher prepared materials used as follow-up activities. Teachers also integrated literature into reading instruction by reading one or two novels a year, typically using whole-class instruction. In language arts, teachers used whole-class instruction and usually used a published language arts series as well as teacher-made activities in writing and language usage. In mathematics, teachers used a district-adopted mathematics text. Typically, mathematics involved whole-class instruction followed by follow-up activities from the text or generated by the teacher. The control schools did not use structured cooperative learning during classroom instruction, although occasional cooperative activities were used by some of the teachers.

The control schools did not implement most of the other components of the Cooperative Elementary School model. Specifically, the control schools did not use an in-class model for mainstreaming special education students, and they did not use peer coaching or regularly use cooperative planning between teachers. The control schools did have school improvement teams made up of administrators and faculty, much like

our building-level steering committee, but typically the school improvement team met less frequently.

Both the control and experimental schools allocated the same amount of time to reading, language arts, and mathematics instruction daily, in compliance with school district guidelines. In reading all of the schools used similar basal reading programs selected from an adoption list provided by the school district, however, the experimental schools did not use adjunct materials (i.e., workbooks) provided by the basal publisher whereas the control schools typically did use them. Similarly in language arts both the experimental and control schools used a district-adopted language arts program, but in the experimental schools it was used as supplemental material rather than as the central curriculum. In mathematics, the control schools used the district-adopted textbook, whereas the experimental schools used the TAI curriculum, using the district text for application activities only.

Experimental. The experimental schools used the Cooperative Elementary School model, as described previously. The components were gradually phased-in during the first year of the study. Prior to implementation of a component, the faculty was given training or introduction to the component that included the rationale and goals as well as steps on how to implement the component. During the school year members of the research staff observed classes, participated in meetings with the teachers, and observed steering committee meetings in order to facilitate implementation of the program components.

Implementation of the Components

Steering committee. The first component of the Cooperative Elementary School to be implemented was the building-level steering committee. It was important to establish this committee because they would act as the main vehicle for communication between the teachers, school administration, and research staff. The steering committee was organized prior to the start of the school so that it could help resolve problems which might occur as we began implementing the other components of the model.

Cooperative learning programs. We gradually phased in the implementation of the cooperative learning programs during the first year of the project. The goal was to have cooperative learning used by all of the teachers across a variety of curriculum areas, with specific emphasis on the CIRC program in reading and language arts, and the TAI program in mathematics. The teachers also were trained in Jigsaw II, Teams-Games-Tournaments (TGT), and Student Teams Achievement Division (STAD) which are generic cooperative learning models that can be used in a variety of content areas, like social studies, spelling, or science (see Slavin, 1986). The training for each program included explanation of the processes and the rationale behind them, and a detailed manual on how to use the program in a classroom. Trainers also provided teachers with simulated demonstration lessons for each program. The initial training occurred in August, with training on subsequent cooperative learning programs taking place at roughly 2-month intervals so the teachers were not overwhelmed by too many new programs at the same time. The steering committees were influential in the scheduling of additional training by giving the research staff feedback on the degree to which the faculties were ready to take on another new program. By March of the first year of the

study all of the curricular elements of the program were fully implemented. Some of the school organization components, like mainstreaming special education students, were only partially implemented the first year due to scheduling difficulties. During the second year of the study there was full implementation of all of the elements of the Cooperative Elementary School model.

Following training the research staff observed the teachers as they used the programs in their classrooms. We gave the teachers feedback on their implementation in order to improve the quality of their instruction and to maintain fidelity to the program. Teachers also coached one another as they started using the cooperative learning programs. The teachers used cooperative planning to coordinate instruction across classes and also to help one another resolve problems or questions they encountered.

Measures

Achievement pretests. We used standardized test scores from district records to match classes on entering ability and as a covariate in all statistical analyses. The scores used were the Total Reading, Total Language, and Total Mathematics scores from the California Achievement Test, Form C which were given in the fall of the first year of the study. The pretest scores were transformed to z scores separately for each grade, so that the data could be analyzed by grade level and collapsed across grade levels if there were no grade-by-treatment interactions.

Achievement posttests. In the spring of the second year of the study, at the end of the study, the students were administered the reading, language, and mathematics subtests of the California Achievement Test, Form E. Raw scores from the subtests were

transformed to z scores separately for each grade to enable us to combine scores across grades if there were no grade-by-treatment interactions.

Attitude measures. The students were given an attitude measure as a pre and posttest. Pretests were given in the fall of the first year of the project, and posttests were given in the spring of the second year. The attitude measure asked students to rate their attitude toward and their perceived ability in their five major subjects (reading, language arts, social studies, science, and mathematics). The students were asked to list their three favorite subjects and the three subjects where they had the most ability (see appendix A). For each of the five subjects the students were also asked to rate their interest and their ability on a three point scale ("I like it a lot"/"I don't like it" and "I am really good at this"/"I am not very good at this").

Social relations measure. The students were given a measure of their social relations as a pre and postmeasure at approximately the same time they were given the other pre and posttests. The social relations measure asked students to list the names of their friends in the class. The results were analyzed by comparing the average number of friends listed by experimental and control students. For special education students, the social relations measure were reanalyzed to determine the number of time each academically handicapped student was selected as a friend by his/her nonhandicapped peers. This second analysis provided a measure of social acceptance of mainstreamed academically handicapped students.

## Results

### Analyses

The authors used standardized test scores that were converted into z scores in the achievement analyses . For the attitude and social relation measures we used raw scores in all of the analyses. The data were analyzed by using individual-level MANCOVA with the appropriate pretest (Total Reading, Total Language, or Total Mathematics) used as the covariate to increase the power of the analyses. Individual-level analyses were used to assess the effects of the 2-year implementation because the students changed teachers and the classes did not remain intact over the duration of the study, thus reducing the potential teacher-level and class-level effects.

Initially grade-by-treatment analyses were conducted to determine if the treatment had differential effects on achievement, attitudes or social relations at different grade levels. None of the grade-by-treatment analyses were significant, so the data were collapsed across grade levels to simplify the discussion of the results.

Achievement pretests. As noted previously, the experimental and control classes were matched on initial achievement on the California Achievement Test. There were no significant pretest differences on Total Reading, $F = 2.2$, or Total Language, $F<1.0$ (see Table 1). There were, however, significant pretest differences on Total Mathematics, $F = 9.02$, $p = .01$, favoring the control students.

Achievement posttests. The results from the MANCOVAs indicated highly significant differences on reading vocabulary, $F = 23.4$, $p < .01$, reading comprehension, $F = 37.6$, $p < .01$, language expression, $F = 22.8$, $p < .01$, and math computation, $F = 24.6$, $p < .01$ (see Table 1). There were no significant differences on the measures of language

mechanics, F = 1.3, and math application, F <1.0. The means, standard deviations, and effect sizes are presented in Table 1. The effect sizes for the four significant main effects ranged from +.24 to +.33. (The effect size equals the difference of the adjusted treatment means divided by the unadjusted control group standard deviation.)

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Insert Table 1 about here

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Attitude measures. On measures of students attitudes toward and their perceived ability in reading, language arts, and mathematics the only significant pretest difference was on students' attitudes toward language arts $F=5.43$, $p<.05$. The control group students had a significantly more positive initial attitude toward language arts than did the students in the experimental group (see Table 2).

The MANCOVA analyses of the postmeasures of students attitudes and their perceptions of their abilities indicated no significant differences on any of these measures.

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Insert Table 2 about here

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Social Relations. The social relations measure looked at the number of friends listed by students in the treatment conditions at the beginning of the study and the number listed two years later at the end of the study. There were no significant differences on the premeasure, F <1.0. On the postmeasure the students in the experimental schools listed significantly more friends that did their peers in the control schools $F = 16.26$, $p < .01$ (see Table 3). The effect size of this main effect was +.38.

Effects for special education students. For the subpopulation of students who were identified to receive special education services, the results looked similar to those of the entire treatment population. There were no significant pretest differences on measures of their academic ability in reading, $F = 1.33$, language arts, $F = 3.19$, or mathematics, $F < 1.0$, as measured by standardized achievement tests. There were significant posttest differences in favor of the academically handicapped students in the Cooperative Elementary School in reading vocabulary, $F = 13.48$, $p < .01$, reading comprehension, $F = 14.39$, $p < .01$, language expression, 11.41, $p < .01$, math computation, $F = 10.77$, $p < .01$, and math application, $F = 3.75$, $p < .05$ (see Table 4). There were no significant differences in language mechanics, $F < 1.0$. The effect sizes for the significant main effects ranged from +.35 to +.85.

The premeasure of social relations indicated that there were no significant differences between the treatment groups in the number of friends they selected, $F < 1.0$. On the postmeasure, academically handicapped students in the experimental schools listed significantly more friends, $F = 6.88$, $p < .01$, than did their counterparts in the control schools. The social relations measure was also used to assess the level of the social acceptance of academically handicapped students, as measured by the number of times academically handicapped students were selected as friends by their nonhandicapped classmates. Initially there were no significant differences, $t < 1.0$. On the postmeasure academically handicapped students in the experimental schools were selected as friends by nonhandicapped students significantly more often than were their counterparts in the control schools, $t = 4.33$, $p < .01$. This comparison had an effect size of +.90, nearly a full standard deviation difference (see Table 3).

## Discussion

The results of this study support the hypothesis that implementing cooperative learning on a broad scale across many content areas can fundamentally restructure classroom instruction. Cooperative learning can be the primary mode of instruction and when integrated with state-of-the-art instruction in reading, language arts, and mathematics can be effective in producing higher student achievement. The students in the Cooperative Elementary Schools clearly outperformed their peers in their traditional schools on standardized measures of reading vocabulary, reading comprehension, language expression, and mathematics computation. The effect sizes, which ranged from approximately a quarter to a third of a standard deviation, suggest that these differences were rather substantial, particularly considering that the differences were obtained on standardized achievement tests which are typically stable measures.

These results are also important because they were the result of a long-term implementation of cooperative learning. The positive effects suggest that cooperative learning can maintain its effectiveness over time, and that the effectiveness is not due to the novelty of cooperative learning, or the Hawthorne effect, as critics have suggested (Bossert, 1989). This shows that multifaceted instructional programs that use state-of-the-art instruction and curriculum with cooperative learning classroom processes can produce and maintain significantly higher achievement.

Typically cooperative learning results in more positive student attitudes in the subjects where cooperative learning processes are used (cf. Slavin, 1990). Upon comparing students' attitudes toward different subjects, this study found no difference between the attitudes of students in cooperative learning and those in more traditional

instruction. Furthermore, these measures indicated little or no change in students attitudes toward subjects from the initial measure before cooperative learning was being used to the postmeasure nearly two years later. Both of these results are contrary to the large body of research literature on cooperative learning which generally shows more positive student attitudes toward subjects where cooperative learning is used. The contradictory results may be largely due to the lack of novelty of cooperative learning when it is implemented for a longer period of time and is the primary mode of instruction in the school. In studies where cooperative learning is used in one subject for a relatively brief time cooperative learning may produce a Hawthorne effect on students' attitudes. In the Cooperative Elementary school cooperative learning processes may have been perceived as "normal instruction," negating any potential impact the instructional process would have on improving students' attitudes toward specific subjects. With cooperative learning processes being constant across subjects in the Cooperative Elementary School, the attitudinal measures probably reflect only students' attitudes toward the content of the subject rather than the instructional processes being used.

The results of the study also support the hypothesis that cooperative learning can be used as a vehicle to enhance a school's ability to implement the type of structural change required to successfully mainstream academically handicapped students into the regular classroom. The highly significant achievement effects for students in special education show that using cooperative learning to mainstream handicapped students can be an effective solution to the issue of appropriate education for these students. The effect sizes which range from a third to more than three quarters of a standard deviation

suggest that academically handicapped students have much to gain through using cooperative learning as a vehicle to implement mainstreaming.

The programs used in the Cooperative Elementary Schools provided the instructional flexibility to accommodate the increased class-wide heterogeneity inherent in mainstreaming. Additional instructional resources were readily available as students who needed help could rely on support and feedback from their peers as well as from the classroom teacher and the special education teacher. Cooperative learning also provided structures so the students could help manage the classroom, freeing the teacher to provide more individualized instruction to students who needed it. In this way the classroom processes offer the potential for more instruction from the teacher for all students, especially low-achieving and handicapped students.

The instructional support for academically handicapped students in the Cooperative Elementary School is further enhanced by the use of an "in-class model" of support services, where the special education teacher goes in to the regular education classroom and team teaches with the classroom teacher. This offers the student more individualized instruction from the special education teacher, and the social and motivational benefits of being in the regular classroom.

Socially the impact of using cooperative learning was positive for both academically handicapped and nonhandicapped students. Nonhandicapped students listed significantly more friends than did the students in traditional education. This indicates that there were better peer relations in the Cooperative Elementary Schools, a result that replicates that of previous research in cooperative learning (cf. Johnson & Johnson, 1989; Sharan, 1980; Slavin, 1990). Unlike typical classroom instruction during

which students tend to have only casual and rather superficial contact, cooperative learning processes have students working together to achieve a common goal. This produces more meaningful interactions between the students and a sense of interdependence. As these work groups change over time and the students collaborate with a variety of students in the class leading to better peer relations in the class and an increase in students' friendships.

The Cooperative Elementary Schools also had much better social acceptance of mainstreamed academically handicapped students. A handicapped student in the Cooperative Elementary School was likely to be chosen as a friend by a nonhandicapped student 50% more often than were their peers in the more traditional schools. These are particularly important result because one of the goals of mainstreaming is to promote more social acceptance of students who have special needs. However, research has suggested that the opposite effect may often be true. Mainstream handicapped students typically are not well integrated into the class socially or academically and as a result are poorly accepted by their peers and often ostracized (Bryan, Bay, Lopez-Reynas, & Donahue, 1991; Gottlieb, Corman, & Curci, 1984; Reid, 1984). The results of this study suggest that true mainstreaming goes beyond academics, that handicapped and nonhandicapped students also need classroom environments that will promote social development and acceptance as well. By working within cooperative learning structures nonhandicapped students learn to accept handicapped students into the social and academic milieu of the classroom, truly mainstreaming them.

This study did not evaluate all of the components of the cooperative learning program, but instead focused on the questions discussed above centered around using

cooperative learning in a variety of content areas and mainstreaming academically handicapped students. Other components, such as peer coaching, site-based management, and cooperation with the parents and community, were not specifically addressed as they were seen primarily as serving a facilitative role in promoting the changes in curricula, instructional processes, and school organization. It is impossible to determine the impact of any of these components from the data presented.

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Table 1

Standardized Achievement Measures
Adjusted Means, Standard Deviations, and Effect Sizes
(Collapsed Across Grades)

| | Coop. Sch. | | Control | | F | Effect Size |
|---|---|---|---|---|---|---|
| Pretests: | | | | | | |
| Reading | -.05 | (.97) | .04 | (1.02) | 2.20 | |
| Language | -.01 | (.99) | .01 | (1.00) | <1.0 | |
| Mathematics | -.11 | (.95) | .09 | (1.04) | 9.02** | |
| Posttests: | | | | | | |
| Read. Voc. | .13 | (.60) | -.14 | (.68) | 23.36** | +.27 |
| Read. Comp. | .17 | (.64) | -.16 | (.71) | 37.56** | +.33 |
| Lang. Mech. | .03 | (.70) | -.03 | (.76) | 1.26 | +.06 |
| Lang. Expr. | .12 | (.64) | -.12 | (.75) | 22.78** | +.24 |
| Math Comp. | .14 | (.77) | -.13 | (.85) | 24.60** | +.27 |
| Math Appl. | .02 | (.70) | -.02 | (.85) | <1.0 | +.05 |
| N (Students) | 520 | | 592 | | | |
| Number of Classes | 26 | | 30 | | | |

Table 2

Students' Attitude
Means, Standard Deviations, and Effects

| | Coop. Sch. | | Control | | F |
|---|---|---|---|---|---|
| Attitude Toward Reading | | | | | |
| Pretest | 3.30 | (.91) | 3.28 | (.83) | <1.0 |
| Posttest | 3.33 | (.80) | 3.41 | (.86) | 1.39 |
| Attitude Toward Language Arts | | | | | |
| Pretest | 2.93 | (.89) | 3.11 | (.84) | 5.43* |
| Posttest | 3.04 | (.79) | 3.10 | (.82) | <1.0 |
| Attitude Toward Mathematics | | | | | |
| Pretest | 3.59 | (.74) | 3.60 | (.73) | <1.0 |
| Posttest | 3.50 | (.77) | 3.55 | (.72) | <1.0 |
| Perceived Reading Ability | | | | | |
| Pretest | 3.56 | (.93) | 3.45 | (.86) | 2.48 |
| Posttest | 3.49 | (.81) | 3.48 | (.87) | <1.0 |
| Perceived Language Arts Ability | | | | | |
| Pretest | 3.36 | (.86) | 3.34 | (.85) | <1.0 |
| Posttest | 3.28 | (.97) | 3.28 | (.82) | 1.68 |
| Perceived Math Ability | | | | | |
| Pretest | 3.67 | (.74) | 3.62 | (.74) | <1.0 |
| Posttest | 3.61 | (.78) | 3.52 | (.80) | 3.52 |
| N (Students) | 520 | | 592 | | |

Table 3

Classroom Social Relations
Means, Standard Deviations, and Effect Sizes

| | Coop. Sch. | | Control | | F | Effect Size |
|---|---|---|---|---|---|---|
| Number of Friends: | | | | | | |
| Premeasure | 5.79 | (3.81) | 5.84 | (3.78) | <1.0 | |
| Postmeasure | 8.33 | (3.96) | 7.01 | (3.52) | 16.26** | +.38 |
| N (Students) | 520 | | 592 | | | |
| | | | Special Education Students | | | |
| Number of Friends: | | | | | | |
| Premeasure | 5.03 | (2.81) | 5.10 | (3.04) | <1.0 | |
| Postmeasure | 9.11 | (4.27) | 6.29 | (3.29) | 6.88** | +.86 |
| Number of Time Picked By Non-Special Education Students | | | | | | |
| Premeasure | 2.83 | (1.76) | 2.78 | (1.54) | t<1.0 | |
| Postmeasure | 5.83 | (2.39) | 3.81 | (2.24) | t=4.33** | +.90 |
| N (Students) | 40 | | 36 | | | |

Table 4

Special Education Students: Standardized Achievement Measures
Means, Standard Deviations, and Effect Sizes
(Collapsed Across Grades)

| | Coop. Sch. | | Control | | F | Effect Size |
|---|---|---|---|---|---|---|
| Pretests: | | | | | | |
| Reading | -1.31 | (.78) | -1.29 | (.70) | 1.33 | |
| Language | -1.27 | (.81) | -1.30 | (.65) | 3.19 | |
| Mathematics | -.98 | (.73) | -.98 | (.80) | <1.0 | |
| Posttests: | | | | | | |
| Read. Voc. | -.98 | (.86) | -1.48 | (.66) | 13.83** | +.76 |
| Read. Comp. | -1.00 | (.96) | -1.53 | (.62) | 14.39** | +.85 |
| Lang. Mech. | -.99 | (.96) | -1.21 | (.85) | .85 | +.25 |
| Lang. Expr. | -.97 | (.97) | -1.55 | (.78) | 11.41** | +.74 |
| Math Comp. | -.10 | (.65) | -.54 | (.75) | 10.77** | +.59 |
| Math Appl. | -.28 | (.58) | -.53 | (.71) | 3.75* | +.35 |
| N (Students) | 40 | | 36 | | | |